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South Korea's Drone Security: The Normalization of Drone Warfare and South Korea's Response

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Drones are no longer auxiliary military assets. The Ukraine War and the recent U.S.–Iran conflict demonstrate that warfare has entered an era of large-scale drone attrition, in which victory increasingly depends on the ability to produce, sustain, and continuously employ unmanned systems rather than on the performance of individual weapon platforms alone. Modern drone warfare is reshaping operational concepts, force structures, and national defense planning.

This transformation extends beyond the battlefield. Drones have evolved from intelligence, surveillance, and reconnaissance (ISR) platforms into low-cost precision strike systems capable of disrupting an adversary's decision-making process. By combining persistent surveillance with immediate strike capabilities, drones compress the interval between detection and engagement while imposing continuous operational and psychological pressure on defenders. In future conflicts, the side that can maintain this detect–decide–strike cycle under sustained attrition will possess a decisive operational advantage.

North Korea has become one of the fastest learners of these emerging trends. Drawing lessons from Russia's war in Ukraine, Pyongyang is incorporating drone warfare into its military doctrine and force modernization efforts. Rather than attempting to compete directly with South Korea's superior conventional military capabilities, North Korea seeks to exploit inexpensive loitering munitions, artificial intelligence, and mass production to create an asymmetric advantage. Drone operations are increasingly intended not merely to destroy targets, but also to delay decision-making, exhaust air-defense systems, and undermine the operational cohesion of allied forces.

South Korea, however, continues to approach drones largely as individual acquisition programs rather than as part of an integrated national security ecosystem. Existing policies emphasize procuring advanced platforms while paying insufficient attention to wartime production capacity, resilient

supply chains, operational doctrine, and integrated counter-drone networks. Such an approach risks leaving South Korea vulnerable in a future conflict characterized by sustained drone attrition.

This paper argues that South Korea should adopt a comprehensive concept of Drone Security—a national capability that ensures the resilience of the detect–decide–strike cycle despite continuous battlefield losses and disruption. Drone Security extends beyond military modernization to encompass industrial capacity, technological innovation, secure supply chains, communications infrastructure, data security, and civil-military integration. To realize this objective, Seoul should establish a whole-of-government strategy while institutionalizing trilateral drone cooperation with the United States and Japan to strengthen collective production capacity, technological collaboration, and operational resilience.

The Normalization of Drone Warfare

The Ukraine War represents the first conflict in history in which drones became the dominant instrument of sustained battlefield operations rather than merely a supporting capability. Since Russia's invasion of Ukraine in February 2022, drone employment has expanded dramatically in both scale and sophistication. What initially began as limited reconnaissance missions has evolved into a continuous contest of industrial production, operational adaptation, and battlefield endurance.

Ukraine has continuously expanded its drone inventory, reportedly producing approximately 800,000 drones in 2023, increasing to around two million in 2024, four million in 2025, and targeting roughly eight million units for 2026. Most importantly, Kyiv has focused on First-Person View (FPV) loitering munitions, employing them extensively against armored vehicles, trench systems, logistics assets, and troop concentrations. Ukrainian officials estimate that FPV drones have accounted for roughly 60 percent of Russian battlefield losses.

Russia has adapted equally rapidly. Beginning with Iranian-designed Shahed-136 loitering munitions, Moscow has substantially expanded domestic drone production while simultaneously integrating FPV drones into tactical operations. Large-scale drone attacks involving hundreds of loitering munitions in a single day have become increasingly common. The center of gravity has therefore shifted from platform quality toward sustainable production capacity and attrition management.

Consequently, modern battlefields are increasingly defined by persistent drone surveillance combined with immediate precision strikes. Traditional maneuver corridors are gradually giving way to what may be described as drone-dominated no-man's lands—areas extending approximately 10 to 20 kilometers beyond the front line, where virtually any detectable movement becomes vulnerable to immediate attack. Both Russia and Ukraine have responded by establishing specialized drone units dedicated exclusively to reconnaissance, strike operations, electronic warfare, and counter-drone missions. Drone warfare has thus become a contest of industrial resilience rather than technological superiority alone.

Recent developments during the U.S.–Iran war further reinforce this trend. Iran employed thousands of unmanned aerial vehicles alongside ballistic and cruise missiles in repeated saturation attacks designed to exhaust coalition air-defense systems. Rather than functioning solely as precision strike weapons, drones became instruments of cost imposition, compelling defenders to intercept

inexpensive UAVs with significantly more expensive interceptor missiles such as the Patriot PAC-3. This dramatically increased defensive expenditures while gradually reducing operational readiness.

The economics of drone warfare fundamentally favor the attacker. A relatively inexpensive FPV drone costing roughly US$1,000 can destroy armored vehicles worth several million dollars, while Shahed-class loitering munitions costing tens of thousands of dollars can compel defenders to expend interceptor missiles valued at several million dollars. Such cost asymmetry fundamentally alters the economics of modern warfare by enabling inexpensive systems to neutralize high-value military assets.

Even the United States has begun adapting to this new operational environment. Instead of relying exclusively on expensive unmanned platforms such as the MQ-9 Reaper or RQ-4 Global Hawk, Washington has introduced lower-cost combat drones, including the Low-Cost Uncrewed Combat Attack System (LUCAS). This reflects growing recognition that future conflicts will require affordable systems capable of large-scale, sustained deployment rather than small numbers of exquisite platforms.

Perhaps the most profound implication of drone warfare is not its destructive power but its impact on military decision-making. Large numbers of drones approaching simultaneously from multiple directions create continuous demands for detection, identification, engagement, and command decisions. Even when interception succeeds, commanders are forced into an unrelenting cycle of rapid decision-making that gradually degrades command efficiency. In this sense, drones have evolved beyond precision weapons into instruments capable of disrupting an adversary's decision architecture itself.

North Korea's Adaptation to Drone Warfare

North Korea has carefully studied the operational lessons emerging from the Russia–Ukraine War. Pyongyang appears to have concluded that future battlefield success depends less on technological sophistication than on the ability to mass-produce expendable systems capable of sustaining continuous combat operations. For a military that remains conventionally inferior to the combined forces of South Korea and the United States, loitering munitions offer an affordable means of offsetting conventional disadvantages while imposing disproportionate operational costs on the defender.

Unlike previous modernization initiatives, North Korea's drone program has received direct and sustained attention from Kim Jong Un. Since 2024, Kim has repeatedly emphasized unmanned systems as a central pillar of military modernization while explicitly advocating the integration of artificial intelligence into future drone operations. These initiatives suggest that Pyongyang seeks not merely to acquire new weapon systems but to automate the battlefield decision cycle by combining AI-enabled target recognition with autonomous strike capabilities.

North Korea has simultaneously expanded the diversity of its drone inventory. Publicly unveiled systems now include tactical loitering munitions with operational ranges of approximately 100 kilometers, theater-level strike drones reportedly exceeding 1,000 kilometers in range, and

inexpensive cardboard-based expendable drones intended for mass production. The objective appears to be the creation of a layered drone force capable of operating across multiple operational levels.

Equally significant is North Korea's expanding cooperation with Russia. More than 10,000 North Korean workers are reportedly supporting drone production inside Russia, with projections suggesting that this workforce could expand substantially. Beyond labor contributions, this arrangement provides North Korea with valuable access to production techniques, operational experience, and industrial know-how acquired during Russia's ongoing war effort.

This cooperation is increasingly evolving into a broader strategic network involving China, Russia, Iran, and North Korea (CRINK). Within this emerging ecosystem, Iran contributes combat-proven drone designs, Russia provides operational doctrine and battlefield feedback, China supplies critical electronic components and manufacturing capacity, while North Korea offers low-cost labor and mobilization-oriented production capabilities. Rather than functioning as isolated bilateral relationships, these four countries are gradually forming an integrated wartime production network linking combat experience, technological innovation, industrial manufacturing, and resilient supply chains.

The strategic significance of this emerging CRINK network extends well beyond technology transfer. It represents the formation of a self-reinforcing ecosystem in which battlefield experience continuously informs technological development, industrial production, and operational doctrine. Such integration has the potential to accelerate North Korea's drone modernization while substantially expanding its wartime production capacity. If current trends continue, Pyongyang may emerge as one of the world's largest producers of expendable military drones, posing a significant challenge to security on the Korean Peninsula.

North Korea's Emerging Drone Kill Chain

North Korea is no longer simply acquiring drones; it is redesigning its operational concept around them. Recent military exercises indicate that Pyongyang has begun integrating drones into a new doctrine that fundamentally redefines the relationship between reconnaissance, strike operations, and armored maneuver. Rather than serving as supporting assets, drones are increasingly positioned as the primary means of shaping the battlefield before conventional forces are committed.

During a combined infantry–armor exercise conducted in March 2026, North Korea publicly demonstrated a three-stage operational sequence consisting of (1) loitering munition strikes, (2) anti-tank missile attacks, and (3) armored exploitation. This sequence reveals an important doctrinal shift. Instead of relying on artillery to prepare the battlefield, North Korea intends to use drones to locate, identify, and destroy critical targets before conventional maneuver forces advance.

In this emerging concept, loitering munitions simultaneously perform ISR and strike missions, dramatically compressing the interval between target detection and engagement. Command posts, anti-tank positions, radar sites, and air-defense systems become priority targets during the opening phase of combat. By neutralizing these critical nodes first, drones create favorable conditions for follow-on operations while minimizing the exposure of conventional forces.

The second phase introduces what may be described as tactical mixed fires. Large numbers of inexpensive FPV drones are employed to establish a "kill zone," forcing defenders to expose positions and expend valuable defensive resources. Once surviving targets have been identified, more expensive anti-tank guided missiles and precision fires are employed selectively against high-value assets. This approach mirrors the cost-imposition strategy demonstrated on the battlefields of Ukraine, where low-cost drones are used to maximize the effectiveness of limited high-end precision weapons.

The final phase fundamentally redefines the role of armored forces. Tanks are no longer expected to spearhead offensive operations as they traditionally have. Instead, they function as decisive exploitation forces**,** advancing only after drones have degraded enemy defenses and disrupted command-and-control networks. Rather than initiating breakthroughs, armored formations are employed to consolidate success after drone operations have already fractured the defender's operational cohesion.

This represents a significant departure from traditional Soviet-style combined arms doctrine. North Korea appears to be transitioning from an armor-centric operational model toward a drone-centric operational architecture, in which unmanned systems become the primary instrument for shaping the battlefield while conventional forces exploit the resulting opportunities. In effect, Pyongyang is constructing what may be called a North Korean Drone Kill Chain—a network that integrates ISR, AI-assisted decision support, loitering munitions, precision fires, and maneuver into a single operational system.

North Korea's evolving equipment design reinforces this doctrinal transformation. The newly unveiled Chonma-series main battle tanks feature enhanced top armor intended to counter FPV drones and top-attack anti-tank weapons, while previously mounted anti-tank missile launchers have reportedly been removed. These modifications suggest that survivability has become a greater priority than organic firepower. Simultaneously, improvements to active protection systems (APS) and fire-control systems indicate an effort to ensure armored survivability within an increasingly drone-saturated battlefield.

Although it remains uncertain whether North Korea can successfully field sophisticated AI-enabled autonomous strike systems in the near term, its strategic direction is unmistakable. By combining drones, artificial intelligence, and networked strike capabilities, Pyongyang seeks to synchronize detection, decision-making, and engagement into a single operational cycle capable of overwhelming conventional defensive systems.

Future North Korean Operational Concepts

Should conflict erupt on the Korean Peninsula, North Korea's drone campaign is unlikely to resemble the limited infiltration or psychological operations traditionally associated with unmanned aircraft. Instead, drones would likely constitute the opening phase of a comprehensive offensive designed to paralyze South Korea's operational decision-making before large-scale maneuver operations commence.

At the tactical level, North Korea would likely launch thousands of FPV loitering munitions and short-range attack drones along the Military Demarcation Line (MDL) and the Forward Edge of the Battle

Area (FEBA). Primary targets would include guard posts, anti-tank positions, artillery observation posts, armored assembly areas, division and corps headquarters, radar installations, and forward air-defense systems.

Rather than conducting isolated strikes, these drones would operate as persistent swarms approaching from multiple directions at low altitude. Continuous surveillance would enable immediate attacks against any detected movement, effectively preventing troop maneuver, logistics operations, and battlefield reinforcement. If South Korea lacks sufficiently robust counter-drone capabilities, portions of the front line could evolve into drone-dominated no-man's lands, where sustained movement becomes virtually impossible.

Such areas would rapidly develop into what may more accurately be described as structural kill zones rather than simple contested spaces. Reinforcement units would struggle to reach frontline positions, casualty evacuation would become increasingly difficult, and combat engineers would encounter severe obstacles in repairing roads, constructing defensive positions, or maintaining mobility corridors. As command vehicles, communication systems, fuel convoys, and ammunition transporters become highly vulnerable to persistent drone surveillance, commanders would likely reduce maneuver activity altogether, leading to a progressive degradation of operational tempo and battlefield cohesion.

Once these conditions are established, North Korea would likely employ integrated mixed fires combining FPV drones, loitering munitions, anti-tank missiles, long-range artillery, and multiple rocket launchers. Drones would continuously identify targets, while follow-on precision fires would destroy surviving assets. Armored and mechanized formations would then exploit localized breakthroughs generated by the drone campaign rather than attempting costly frontal assaults.

At the theater level, Pyongyang would probably adopt a similar strategy. Hundreds of long-range loitering munitions, synchronized with long-range rocket artillery and a limited number of ballistic and cruise missiles, would be employed in repeated waves designed to exhaust South Korea's integrated air-defense system.

The operational objective would not be the immediate destruction of strategic targets. Instead, inexpensive drones and rocket artillery would first compel South Korea to expend large quantities of Patriot PAC-3 and Cheongung-II interceptors. Only after degrading interceptor inventories would North Korea employ its relatively scarce ballistic and cruise missiles against high-value targets such as air bases, command-and-control facilities, logistics hubs, fuel depots, and ammunition storage sites. Likely targets would include major Republic of Korea Air Force installations at Osan, Cheongju, and Gunsan, as well as allied command centers located in Seoul, Pyeongtaek, and Gyeryongdae. In this operational design, drones serve as strategic enablers that create favorable conditions for subsequent precision missile strikes rather than functioning merely as stand-alone attack platforms.

South Korea’s Current Vulnerabilities

South Korea’s military possesses one of Asia’s largest unmanned aircraft inventories, with approximately 1,200 drones currently in service. Since the early 2020s, the Ministry of National Defense has identified artificial intelligence and Manned–Unmanned Teaming (MUM-T) as major

priorities under defense innovation initiatives. Nevertheless, existing force development remains largely focused on acquiring increasingly sophisticated platforms rather than adapting to the operational realities of large-scale drone attrition.

The current air-defense architecture was designed primarily to counter conventional aircraft and ballistic missiles. Although tactical units have begun introducing radar systems, electronic jammers, and short-range interception capabilities, these assets remain insufficiently integrated into a coherent operational network. More importantly, South Korea lacks a resilient system capable of maintaining the complete detect–identify–decide–engage cycle under sustained drone saturation.

The central challenge is therefore not the number of drones available but the absence of an operational architecture capable of functioning under conditions of continuous attrition. Modern drone warfare rewards resilience rather than platform performance. The military that can rapidly replace losses, restore degraded networks, and sustain operational tempo will ultimately gain decision superiority.

South Korea has yet to fully embrace this reality. Existing drone policies continue to prioritize technological excellence over mass production, industrial mobilization, and wartime replacement capacity. Operational doctrine has also failed to evolve at the same pace as technological acquisition. Concepts such as drone-created no-man's lands, persistent attritional warfare, and cost-imposition strategies have yet to be systematically incorporated into operational planning.

Political factors have further complicated military adaptation. Following recent controversy surrounding cross-border drone operations, institutional uncertainty has weakened momentum for drone innovation within the armed forces. Excessive political caution risks discouraging experimentation precisely when rapid doctrinal evolution is required.

Finally, drone development should not remain solely a military responsibility. Successful drone warfare increasingly depends upon close cooperation among defense organizations, intelligence agencies, private industry, universities, and technology firms. Intelligence organizations, in particular, possess comparative advantages in rapid prototyping, classified research, and operational experimentation. The United States has repeatedly demonstrated the value of such civil-military integration in advancing next-generation unmanned systems. South Korea will require a similarly integrated innovation ecosystem if it is to remain competitive in an era increasingly defined by autonomous warfare.

About the Author

As an expert in military strategy and weapons systems, **Dr. Yang Uk** has been active in the defense industry and private military enterprises for over 20 years, and founded and operated IntelEdge Inc., one of the first private military companies in Korea. Since leaving the company, he has commented on various military issues and international conflicts through broadcasting and news media, and has written various writings on weapon systems and military history. He obtained a doctorate in military strategy from Korea National Defense University (KNDU), and has analyzed North Korea's military strategy and WMD programs as a senior research fellow and the director of the WMD Center at the Korea Defense Security Forum (KODEF). He has been an active member of the policy advisory committee of Army, Air Force, Navy, Marine Corps, Joint Chief of Staff, Ministry of National

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